but is the long continued pastime of a peculiar subconscious personality inheriting linguistic tastes and taking childish delight in these creative fancies. Difficult as this hypothesis seems in its application to the formation of so elaborate a language, nevertheless it is fully confirmed by an experiment which the author himself finally made. He bluntly informed the medium of his opinion of the language and produced incontestible proofs that it was only a modified French, whereupon there followed in future seances an attempt to modify the language and correct its too apparent faults, producing an *ultramartien* unlike any other language. This truly is mental vivisection, and one wonders whether subconscious personalities are capable of feeling pain and weariness!

The Hindoo romance presents some greater difficulties. The facts narrated are finally traced to a single obscure and (unfortunately for the medium) unreliable historian named Marlès, whose work Professor Flournoy's hypothesis makes it necessary that Hélène must at one time have seen, although he admits that that seems improbable. The Arabic is limited to a single phrase and the Sanskrit, although it contains many Sanskrit words and some phrases, is for the most part a jargon.

The chapter on the supranormal is a relatively short one. The author continues in his attitude of fairness towards all theories, exhibiting as great contempt for the bigoted devotee of "science" who has accepted the *a priori* impossibility of the supranormal, and has, therefore, no interest in psychic research, as for the credulous spiritist who detects the spirit of his great aunt in every joggle of a table. He even goes so far, perhaps somewhat to the American reader's surprise, as to affirm his faith in telepathy and the movement of objects without contact. He admits, however, only unsatisfactory evidence for these in the case of Hélène, while all the appearances of clairvoyance, lucidity, incarnations and spirit manifestations are explainable as hypnoid phenomena.

As an example of method this book is to be highly commended, and method is what is needed now in the study of automatism. Any one who should complain that the case of Mlle. Smith is not sufficiently "remarkable" to merit 420 pages of minute description fails to understand the importance of the study of secondary personality. The author's intimations of the infantile and reversionary character of the secondary personality are of interest in the light of recent theories.

University of Iowa. G. T. W. PATRICK.

RECENT NEUROLOGICAL LITERATURE.

By COLIN C. STEWART, Ph. D.

The Nervous System and its Constituent Neurones, designed for the use of practitioners of medicine and of students of medicine and psychology: by LEWELLYS F. BARKER, M. B., Associate Professor of Anatomy in the Johns Hopkins University; 2 colored plates and 676 illustrations, pages xxxii and 1122. New York, D. Appleton & Co., 1899.

Although perhaps too technical for the average reader, and lacking, to a certain extent in completeness when considered from the purely physiological side, Prof. Barker's book will remain for many years one of the readiest and most useful works upon the subject. Systematic arrangement, wealth of detail in every subdivision, and profuse and

well chosen illustration, are characteristics which point to the value of the book for reference purposes. Nor is the list exhausted, for we have, in addition to a classified table of contents, a subject index of twenty-six pages, and an index of authors comprising approximately 750 names. Of the illustrations, many of which are original, we have slightly more than one to every two pages of text. Most are in clear line drawing, many are in half-tone, and not a few are in colors.

The first section, of six chapters, is devoted to the development of the neurone concept—the name "neurone" being applied as meaning "a cell belonging to the nervous system, with all its parts." A full historical presentation is made, with the conclusion that the neurone theory is supported by all the facts at our disposal. Reported findings to the contrary are to be regarded as exceptions of relatively rare occurrence. As to the results of Apáthy's work, as yet incomplete, judgment is of necessity reserved.

Section II, with three chapters and 31 illustrations, is devoted to the external morphology of neurones. There is an interesting reference to some of Nissl's later work and his theory that much of the non-cellular cortical gray matter is composed of an interlacing of fine fibrils, resembling neuropil, and not altogether of the dendrites of cortical cells. To these Nissl would attach the highest importance. And this from the closing paragraph of the section: "The whole doctrine, by means of which sleep, anæsthesia, the phenomena of hysteria, double personality, etc., are to be explained by amœboid movements of the dendrites, or the so-called "retraction theory," appears to be based on the single observation of Wiedersheim. . . . The idea has been severely criticised by von Kölliker, and it is worthy of note that a theory so feebly supported by facts has been so widely accepted and made the basis of a mass of clinical generalizations."

The internal morphology of neurones is treated of in the third section, with five chapters and 26 figures. Conflicting views as to ultimate structure are reviewed at length, and many details of staining and technique are given. Chapter XIV is a summary in four pages of our present incomplete knowledge of the internal structure of nerve cells.

The origin of the nervous system in the embryo and the early development of cells and cell relations, with a chapter on segmentation and the mechanical factors of development, are the subjects of Section IV, with 55 illustrations.

The next section is devoted to the neurone as a unit in physiological and pathological processes. The normal metabolism of the nerve cell is followed by a chapter on the degeneration and regeneration of nerves, in which the facts, the literature, and the various methods of demonstrating degenerative changes are fully treated. Chapters XXI, XXII and XXIII discuss the irritability of the neurone and many closely related questions, of which a few are: spontaneity, transference of excitation, the specific energies of nerves, the conducting function of the cell body and the dendrites, and the direction of conduction. The next two chapters treat of the histological changes as the result of fatigue, the influence of a large number of poisons, the effects of anæmia, and of conditions leading to secondary degeneration.

These five sections bring us to page 312. The remainder of the work, Section VI, is devoted to the working out of the topography and relations of the various groups of neurones as they go to form the complex nervous system of man and the mammals. And it is in this latter part of the book especially that we are indebted to the writer for the laborious care with which facts have been drawn together and systematically arranged. The section covers nearly 800 pages, with, roughly, 500 illustrations; and in writing it anatomical, physiological, pathological, embryological, and histological material are fully made use of.

The various groups of neurones are described in order, illustrated both by explanatory diagrams and by reproductions and figures. The peripheral centripetal neurones,—the sensory neurones of the first order,—are considered first, with 70 figures of peripheral sensory endings other than those of special sense, and many others. Then come those centripetal neurones within the central nervous system which connect the end stations of the first group with higher and higher levels—neurones of the second and higher orders. Under this heading are described the tracts in the cord, medulla and higher parts, and the grouping of their cells in nuclei and centers. After the centripetal come the centrifugal neurones of the first order, those connecting the central nervous system with the voluntary muscles of the body; and the centrifugal neurones of higher order, placing the first under the control of higher parts. Under this, among other things, localization of function in motor areas is dealt with. And lastly, four chapters are devoted to the projection, commissural and association neurones of the telencephalon.

The only thing left to be desired is a fuller presentation of the structure and relations of the sympathetic neurones, but as a matter of fact that is not central nervous system, and after all we already have a series of excellent papers by Huber.

The total number of functional cells in the cerebral cortex of man, and the percentage of the total volume of the cortex composed of nerve cell bodies, calculated from Carl Hammarberg's data; together with a comparison of the number of giant cells with the number of pyramidal fibres. HELEN B. THOMPSON: Journ. of Compar. Neurol., IX, No. 2, 1899. pp. 113-140, 2 figs.

Following the method of dividing the cortex into sixteen structurally uniform areas, the author has placed the determination of the number of functional cortical cells at 9,200 million. Only 1.37% of the total volume of the cortex is composed of cells, and the number of giant cells is almost the same as the total number of pyramidal fibres.

A note on the significance of the small volume of the nerve cell bodies in the cerebral cortex in man. H. H. DONALDSON: Journ. of Compar. Neurol., IX, No. 2, 1899. pp. 141-150.

Though of the utmost physiological importance, small differences in the mass of nerve cell bodies must escape detection by the method of weighing, for the total weight of all the nerve cell bodies in the brain is less than 27 grammes. This is less than half the range of variation in weight in groups of brains classified according to sex, mental power, stature or age. Hence these differences must be mainly in growth of medullary substance.

The number and arrangement of the fibres forming the spinal nerves of the frog. I. HARDESTY: Jour. of Compar. Neurol., IX, No. 2, 1899, pp. 64–112; Plates VI to XIII.

The number of fibres decreases in the ventral spinal root from the cord to the ganglion, and in the dorsal root, both ways from the ganglion; the difference being in the number of small, and presumably growing, fibres. The sum of the fibres in the trunk and dorsal branches of a spinal nerve exceeds considerably, in every case, the sum of those in both dorsal and ventral roots combined. The method used by Hardesty is an interesting one. Microphotographs of cross sections of nerves stained in osmic acid were made, and in these photographs the fibres were cancelled by the same movement that clicked an automatic counter.

On some numerical comparisons of the centripetal and centrifugal medullated nerve fibres arising in the spinal ganglia of the mammal. H. H. DALE: Jour. of Physiol., XXV, No. 3, 1900, pp. 196–206; Plate II.

There are in the cat about 0.5 per cent. more fibres in the trunk of a spinal nerve than in the two roots combined, the excess being caused by fibres of small diameter, going probably from the gray ramus to supply the blood vessels or other tissues of the ganglion. The author does not agree with Hardesty in finding fibres arising from cells in the ganglion to end close to it; and concludes from his measurements that fibres of both ventral and dorsal roots taper slightly in size as they pass away from the cord.

Observations on the weight and length of the central nervous system and of the legs in frogs of different sizes (rana virescens brachycephala, Cope). H. H. DONALDSON, and D. M. SCHOEMAKER, Jour. of Comp. Neurol., X, No. 1, pp. 109-132.

The male of this species rarely exceeds 50 grammes in weight, while the female may reach 75 g. or over. The weight of the brain in the largest males is, however, less than that in females of comparable size. This is in direct opposition to the finding published by Fubini in 1881, for *rana esculenta* and *rana temporaria*. The authors have also found that the relative weight of the brain, as compared with that of the spinal cord, decreases as the frog increases in size. This fact makes it possible that more exact comparisons would be made if male frogs of any given weight were compared, not with females of the same size, but with those in the same relative position in the scale of their range of growth. A full grown male frog is probably not comparable with a female frog of the same weight.

In frogs of all sizes the sum of the lengths of the leg bones, and the proportional lengths of the several bones, are nearly constant. The weight of the leg muscles, compared with body weight, increases up to 5 g. in weight, then decreases slightly as the frog increases in size.

A contribution to the study of the pyramidal tract in the central nervous system of man. W. G. SPILLER: Brain, No. 88, Winter 1899, pp. 563-574.

The Marchi method was applied in a case of tumor in the internal capsule and lenticular nucleus. Besides observing the homolateral fibres running with the crossed pyramidal tract, the author describes a tract which separates itself from the pyramidal fibres to lie external to the olivary body on the side of the lesion, and on the periphery of the cord in the upper cervical region. These are interesting when compared with the antero-lateral descending fibres which degenerate in the monkey after cortical lesion.

Spinal cord changes in cases of cerebral tumor. F. E. BATTEN, and J. S. COLLIER: Brain, No. 88, Winter 1899, pp. 473-533.

An examination of a large number of cases of cerebral tumor has led to the conclusion that degeneration in the posterior columns, which occurs in about 65 per cent. of the cases, is of root origin, is independent of the nature or position of the tumor, and is caused by intracranial pressure, distension of the subarachnoid space of the spinal cord, with traction on the spinal roots.

Observations on the ascending tracts in the spinal cord of the human subject. E. E. LASLETT, and W. B. WARRINGTON: Brain, No. 88, Winter 1899, pp. 586-592.

Two human cases, one of caries with disintegration of the mid-dorsal